



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
-----------------	-------------	----------------------	---------------------	------------------

10/662,382

09/16/2003

Tomonori Kanai

4703-0101P

2172

2292

7590

02/07/2006

BIRCH STEWART KOLASCH & BIRCH

PO BOX 747

FALLS CHURCH, VA 22040-0747

EXAMINER

CHU, CHRIS C

ART UNIT

PAPER NUMBER

2815

DATE MAILED: 02/07/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/662,382

Applicant(s)

KANAI ET AL. 

Examiner

Chris C. Chu

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 16 December 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 - 8 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 - 8 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Request for Continued Examination

1. A request for continued examination (RCE) under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on December 16, 2005 has been entered. An action on the RCE follows.

Response to Amendment

2. Applicant's amendment filed on November 18, 2005 has been received and entered in the case.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. Claims 1 – 4 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- (A) In claim 1, lines 15 – 18, it is unclear what applicant regards as “wherein rewiring is connected to the peripheral electrodes, or to the internal electrodes in the case of CSP packaging.” Specifically, the term “rewiring” in the claim is not clear because Fig. 3 and Fig. 4 of the instant invention show the rewiring lines (i.e., reference number 2) on the insulating layer. Thus, the Examiner is not sure it is for the rewiring lines or external connectors (e.g., solder balls or wires in a wire bonding structure). Furthermore, the phrase “in the case of” renders the claim indefinite because it is unclear whether the whole limitation with the phrase is part of the claimed invention. Even further, it is unclear what applicant regards as “a wire is connected to the peripheral electrodes in the case of connecting to external terminals using wire bonding.” First, the phrase “in the case of” renders the claim indefinite because it is unclear whether the whole limitation with the phrase is part of the claimed invention. Second, it is unclear that the claimed invention is a solder bonded package, a wire bonded package or a solder and wire bonded package.
- (B) Dependent claims 2 – 4 do not rectify the deficiency of claim 1 and therefore are similarly rejected.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

Art Unit: 2815

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1 and 3 – 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Seshan (U. S. Pat. No. 6,686,659).

Regarding claim 1, Seshan discloses in e.g., Fig. 6 and Fig. 11 a semiconductor device (500; column 8, line 64) comprising:

- peripheral electrodes (502 at the edge that are surrounded the other 502; column 9, line 18) formed on a periphery of a semiconductor chip (500; column 8, line 64);
- internal electrodes (502 at the center; column 9, line 18) formed inside the peripheral electrodes on the semiconductor chip (see e.g., Fig. 11); and
- circuits (520; column 9, line 55) formed in the semiconductor chip,
- wherein the peripheral electrodes (502 at the edge) are
 - o connected to the circuits by an internal line (i.e., 515; column 9, line 65), and
 - o the internal electrodes are connected to the circuits and the peripheral electrodes by the internal line (see e.g., Fig. 11 and column 10, lines 31 – 37),
 - o said internal line being covered by an insulating layer (320 and/or 322; see Fig. 6 and column 7, lines 28 – 34), and
- wherein the same signal (any input or output signal from or to the circuit element 520; column 9, lines 55 – 58) is either an input and/or output either to or from both the internal electrodes and the peripheral electrodes (since the elements 502 at the center and 502 at the edge are coupled together by an internal trace 515, the elements

502 at the center and 502 at the edge receive same signal from the circuit element

520. see Fig. 11 and column 10, lines 31 – 37), and

Furthermore, the limitation “wherein rewiring is connected to the peripheral electrodes, or to the internal electrodes in the case of CSP package, and a wire is connected to the peripheral electrodes in the case of connecting to external terminals using wire bonding” is intended use language which does not differentiate the claimed structure over Seshan. Since the electrodes of Seshan are capable of performing the intended use such as connecting the electrodes of Seshan to any external connectors (i.e., solder balls or wires), Seshan fully meets this limitation.

Regarding claims 3 and 7, Seshan discloses in e.g., Fig. 11 the internal electrodes comprising a power supply terminal (column 9, lines 16 – 18).

Regarding claims 4 and 8, Seshan discloses in e.g., Fig. 11, column 1, lines 39 – 43 and column 9, lines 55 – 58 the peripheral electrodes not connected to the internal electrodes being used as terminals for RF signals (since the circuit element 520 is radio frequency circuits, inherently, the input/output signals of the elements 502 at the edge are radio frequency signals).

Regarding claim 5, Seshan discloses in e.g., Fig. 11 a semiconductor device (510; column 9, line 51) comprising:

- peripheral electrodes (502 at the edge) formed on a periphery of a semiconductor chip (500; column 8, line 64);
- internal electrodes (502 at the center) formed inside the peripheral electrodes on the semiconductor chip (see Fig. 11); and
- circuits (520; column 9, line 55) formed in the semiconductor chip,

Art Unit: 2815

- wherein the peripheral electrodes (502 at the edge) are connected to the circuits by an internal line (i.e., 515; column 9, line 65) covered by an insulating layer (320 and/or 322; see Fig. 6 and column 7, lines 28 – 34), the internal electrodes (502 at the center) are connected to the circuits and the peripheral electrodes by the internal line (see Fig. 11 and column 10, lines 31 – 37), and the internal electrodes (502 at the center) are also connected to rewired lines (e.g., 603; column 10, line 3), the rewired lines formed above the internal electrodes with an insulating layer (600; column 9, lines 3 – 4) therebetween, and at ends of the rewired lines formed area array electrodes (i.e., 604 in Fig. 11).

Regarding claim 6, Seshan discloses in e.g., Fig. 11 a semiconductor device (510)

comprising:

- peripheral electrodes (502 at the edge) formed on a periphery of a semiconductor chip (500);
- internal electrodes (502 at the center) formed inside the peripheral electrodes on the semiconductor chip (see Fig. 11);
- area array electrodes (604, 608 and 610) connected to selected one of the peripheral electrodes and the internal electrodes and formed on the semiconductor chip; and
- circuits (520; column 9, line 55) formed in semiconductor chip,
- wherein the peripheral electrodes (502 at the edge) are connected to the circuits by an internal line (i.e., 515; column 9, line 65) covered by an insulating layer (320 and/or 322; see Fig. 6 and column 7, lines 28 – 34), the internal electrodes (502 at the center) are connected to the circuits and the peripheral electrodes by the internal line (see Fig.

Art Unit: 2815

11 and column 10, lines 31 – 37), and the area array electrodes (604, 608 and 610) comprise first area array electrodes (604) connected to the internal electrodes (502 at the center) by rewired lines (603) and second area array electrodes (608 and 610) connected to the peripheral electrodes (502 at the edge) by rewired lines (607 and 609).

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Seshan in view of Arnold et al. (U. S. Pat. No. 4,521,449).

Seshan discloses the claimed invention except for the side of the internal electrodes being smaller than the peripheral electrodes. Arnold et al. teaches in Fig. 2 the side of internal electrodes (24; column 5, lines 14 and 15) being smaller than peripheral electrodes (42; column 3, line 50). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Seshan by using the small size of the internal electrodes of Arnold et al. into the internal electrodes of Seshan as taught by Arnold et al. The ordinary artisan would have been motivated to modify Seshan in the manner described above for at least the purpose of providing the density of vias to be less dense than the pads of the I/O connections to the device (column 3, lines 40 – 43).

Response to Arguments

9. Applicant's arguments filed on December 16, 2005 have been fully considered but they are not persuasive.

(A) Response to the Claim Rejections under 35 USC § 102(e)

On page 7, applicant argues that terminal 504 of Seshan is different from the peripheral electrodes in the present invention. This argument is not persuasive because the “peripheral electrodes” in the rejected claim 1 are not specifically defined in the claim or in the specification of instant invention. Thus, a reasonable interpretation of the term “peripheral electrodes” includes the structure taught by Seshan. In other words, the terminals 502 at the edge of Seshan are located at the peripheral area in the chip 500 than the terminals 502 at the center and connected to the solder ball 506. Thus, the terminals 502 at the edge of Seshan anticipate the term “peripheral electrodes.”

Furthermore, applicant argues that the newly amended claim 1 is not anticipated by Seshan. This argument is not persuasive because the newly amended claim 1 is a recitation of the intended use of the claimed invention. Since the electrodes of Seshan are capable of performing the intended use such as connecting the electrodes of Seshan to any external connectors (i.e., solder balls or wires), Seshan fully meets this limitation. Applicant should note that a recitation of the intended use of the claimed invention must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from

Art Unit: 2815

the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim. See *In re Casey*, 152 USPQ 235 (CCPA 1967).

For the above reasons, the rejection under 35 USC § 102(e) is maintained.

(B) Response to the Claim Rejections 2 under 35 USC § 103(a)

On page 8, applicant argues that the pads (24 and 44) in the '449 have no basis to consider as the internal and peripheral electrodes. This argument is not persuasive since the terms such as "internal," "peripheral" and "external" are merely labels or relative terms, which do not patternably distinguish claimed structure from Seshan and the '449. In other words, it is irrelevant that the '449 does or does not specifically separate or call his pads as internal and peripheral electrodes because a reasonable interpretation of the terms "peripheral electrodes" and "internal electrodes" include the structure taught by the '449.

For the above reasons, the rejection is maintained.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Chris C. Chu whose telephone number is 571-272-1724. The examiner can normally be reached on 11:30 - 8:00.

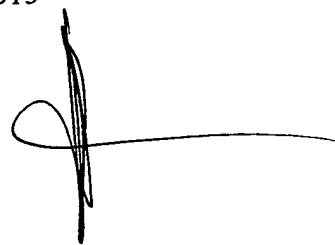
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kenneth Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 2815

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Chris C. Chu
Examiner
Art Unit 2815

c.c.
Tuesday, January 31, 2006

A handwritten signature in black ink, consisting of a large, stylized loop followed by a horizontal line extending to the right.

KENNETH PARKER
SUPERVISORY PATENT EXAMINER